



This document contains Charting the Course of the Comprehensive Conservation and Management Plan for Tampa Bay: Bay Habitats, Fish and Wildlife

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December 1996

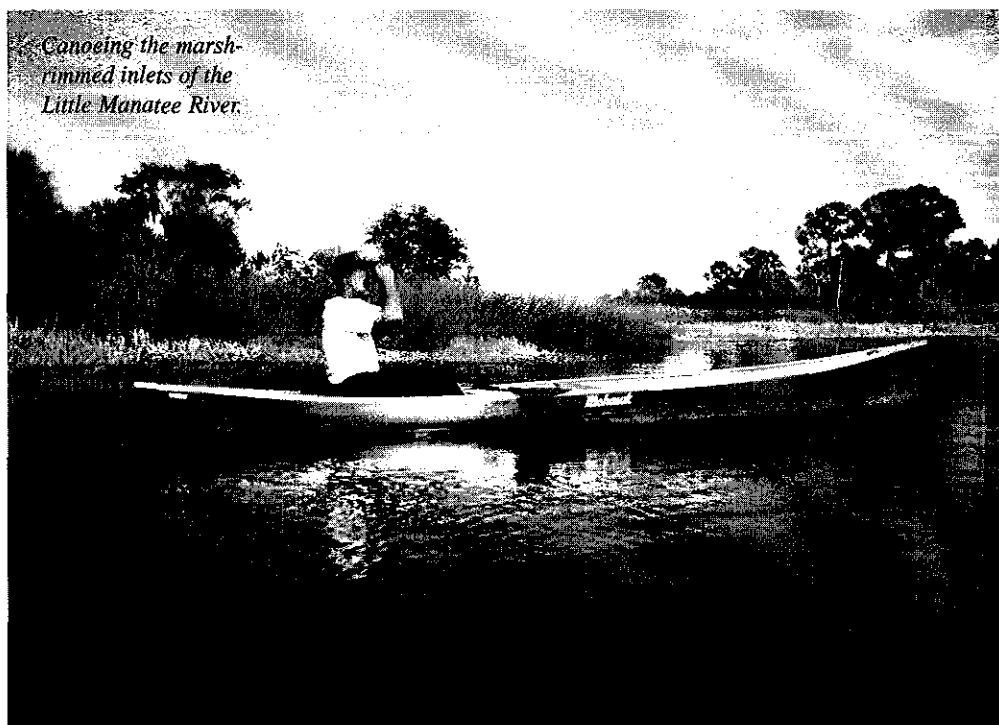


PHOTO: NICK TOTH

Bay Habitats

Tampa Bay's rich mosaic of underwater and coastal habitats support hundreds of species of fish and wildlife, from the familiar brown pelican to the bottom-hugging sea squirt. However, since the 1950s, almost half of the bay's original salt-water wetlands have been lost to dredging and filling for shoreline and port development. Bay seagrasses declined by nearly 40 percent in this same period, although they are waging a comeback in some areas thanks to recent improvements in water quality and reduced dredging and filling.

Neighboring upland habitats of pine forest, oak hammock and shrub also have been heavily impacted by development. Almost all coastal pine forests have been eliminated from the shores of Tampa Bay. These buffer zones and associated freshwater wetlands provide critical habitat for numerous animals, including the wood stork, white ibis, bald eagle and fox squirrel.

Highly productive low-salinity tidal streams along rivers, which provide life-support to many of the bay's juvenile fisheries, also have sustained damage from development, invasive exotic plants and diversions of fresh water for irrigation.

The restoration and protection of these diverse habitats is crucial to the bay's health. Studies by the Tampa Bay National Estuary Program (NEP) suggest that more than

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12,000 acres of seagrass can eventually be recovered along the bay's shallow shelf by "holding the line" on existing nitrogen loadings and offsetting any new nitrogen increases that are expected to occur with growth. Additionally, the NEP will pursue opportunities for seagrass transplanting at select sites. Strategies to repair and preserve the bay's coastal habitats are outlined in a Habitat Restoration and Protection Master Plan finalized by the NEP in 1996 in cooperation with area agencies and local governments. The plan seeks to restore a productive balance and diversity of coastal and associated upland habitats and includes a preliminary list of priority projects for restoration. The overall target is to restore a minimum of 100 acres of low-salinity tidal marsh habitat every five years and to protect and enhance the bay's existing salt marsh and mangrove areas.

Habitat protection, through public land acquisition and conservation easements on private property, is the other focal point of the habitat master plan for Tampa Bay, which identifies 28 specific sites as priorities for protection. The majority of these sites were incorporated into the 1996 Save Our Rivers/Preservation 2000 Plan of the Southwest Florida Water Management District (SWFWMD), dramatically increasing the chances that these vital coastal lands will be acquired and protected given available funding.

Recent developments have brought more good news. In December 1995, SWFWMD purchased nearly 1,600 acres of bayfront property at Terra Ceia Isles in Manatee County. Acquisition of this important tract brings more than 6 percent of the bay's total mangrove acreage, and several hundred acres of vital low-salinity, freshwater and upland habitat, into public ownership and substantially boosts restoration opportunities. Several adjacent parcels of land totaling about 4,700 acres have been proposed for purchase under the state's Conservation and Recreational Lands (CARL) Program.

Finger-fill residential canals constructed in the 1950s and 1960s are a special area of focus because of degraded water quality, habitat loss and siltation. This action plan outlines incentives and opportunities for homeowners to enhance canal habitats and soften shorelines.

GOALS FOR BAY HABITATS

- Increase and preserve the quantity, quality and diversity of seagrass communities. The long-term goal is to restore 12,350 acres of seagrass and protect the bay's existing 25,600 acres.
- Restore an optimum balance of wetland and associated upland habitats for fish and wildlife, while protecting and enhancing existing habitats. Specific targets include:
 - restoration of a minimum of 100 acres of low-salinity tidal marsh every five years, for a total increase over time of 1,800 acres, and the preservation of the existing habitat
 - protection and enhancement of the bay's mangrove and salt marsh communities which total nearly 14,000 acres
 - restoration over time of 150 acres of salt barren habitat

- Protect hard-bottom, oyster reef and soft-bottom communities.

SUMMARY OF ACTIONS FOR BAY HABITATS

- BH-1 Implement the Tampa Bay master plan for habitat restoration and Protection.
- BH-2 Establish and implement mitigation criteria for Tampa Bay, and direct mitigation to high priority projects.
- BH-3 Reduce propeller scarring of seagrass and pursue seagrass transplanting opportunities at select sites.
- BH-4 Restrict impacts to hard-bottom communities.
- BH-5 Improve management of parking and access areas along causeways and coastal areas.
- BH-6 Encourage waterfront residents to enhance shorelines and limit runoff from yards.
- BH-7 Improve compliance with and enforcement of wetland permits.
- BH-8 Expand habitat mapping and monitoring programs.

NOTE: An additional action in the draft Tampa Bay management plan recommended the passage of a law requiring mandatory education of boaters. The Florida Legislature approved a phased-in boater education bill in 1996.

BH

Implement the Tampa Bay Master Plan for Habitat Restoration and Protection

ACTION:

Implement the Tampa Bay Master Plan for Habitat Restoration and Protection, developed by the Tampa Bay National Estuary Program (NEP) in cooperation with local, regional and state agencies and interests.

BACKGROUND:

Recognizing that some coastal habitats have been lost in greater proportion than others, the NEP Master Plan for Habitat Restoration and Protection seeks to restore the historic balance of habitats in Tampa Bay. The Plan outlines specific strategies and goals to increase certain habitats while preserving and enhancing those that now exist.

The Plan emphasizes the restoration of low-salinity tidal streams found along the dozens of meandering creeks that eventually enter Tampa Bay. These quiet areas, critical to the life cycle of fish such as snook and mullet and birds like the great blue heron and snowy egret, comprised about half of all estuarine wetland habitats at the turn of the century. Today, these low-salinity habitats make up about 22 percent of the total. In contrast, mangrove forests also made up about 50 percent of the shoreline in 1900. Today, they account for about 73 percent of the remaining shoreline vegetation — although mangroves — like all of the bay's habitats — have experienced substantial declines in acreage.

The plan seeks to restore a minimum of 100 acres of low-salinity tidal streams every five years, while preserving and enhancing existing mangrove and salt marsh vegetation. The Plan also identifies 28 sites as priorities for habitat protection, either through direct purchase of lands or other means such as conservation easements on private property. Most of these sites were recently incorporated into the Southwest Florida Water Management District's (SWFWMD) Save our Rivers/Preservation 2000 Plan, which sets priorities for public lands acquisition.

While the NEP Plan most heavily focuses on repairing tidal streams, other habitats also will be gradually restored. Attention will be directed to salt barrens (extremely salty high marsh), upland forests and mud flats, all of which play an important role in the Tampa Bay ecosystem. The NEP's Habitat Restoration Subcommittee has adopted the Florida Game & Freshwater Fish Commission's (FGFWFC) strategies for upland restoration. Upland protection needs will be met in part through local land acquisition efforts.

The concept of restoring the balance is relatively new and has important implications for Tampa Bay and other coastal areas. Traditionally, habitat restoration and land acquisition have been largely opportunistic endeavors: Agencies and communities have sought to purchase and restore habitat based on what was available or, in some cases, most visibly connected to the bay. This approach toward highly visible projects helped to build community awareness of the environmental plight and needs of the

bay at a time when this was critically needed. It also demonstrated to skeptics that habitat restoration was possible.

In recent years, restoration efforts have increasingly focused on providing a mosaic of habitat types within a given project to maximize the benefits to fish and wildlife. The NEP Plan takes this concept a step further by developing restoration and protection goals based on the needs of key wildlife “guilds,” or groups of animals that share common habitat and feeding preferences.

The white ibis provides a textbook example of how this new planning approach might protect an impacted species. Populations of the white ibis have declined dramatically in the last half-century, resulting in its listing by the FGFWFC as a species of special concern. Adult ibis nest along the bay, but require inland freshwater sources of food for their young. These shallow freshwater wetlands or “frog” ponds have been hard hit hard by development — forcing the ibis to travel farther and farther to find food for their young.

The NEP Plan outlines four management strategies for the protection and restoration of seasonal freshwater ponds. The first is to identify and protect all potential ibis foraging habitat within a certain distance from the bird colonies in Tampa Bay. The second is to create a wetland mitigation banking system that creates or restores seasonal marshes within these foraging areas before these impacts become unavoidable. One potential location for such a bank is the combined TECO and Reeder Farms property south of Cockroach Bay where three of the four white ibis foraging zones overlap.

The third strategy is to create or restore marshes on publicly owned land. Finally, the Plan recommends that communities and agencies actively seek to acquire new properties for habitat restoration and protection, and especially for seasonal marsh restoration.

Other components of the NEP Plan address management of public lands, especially exotic species control and eradication. The Plan also seeks to direct mitigation to priority restoration projects using criteria discussed in Action BH-2. The Habitat Restoration and Protection Master Plan for Tampa Bay is available under separate cover from the NEP.

ONGOING EFFORTS:

Already, about 100 acres along Tampa Bay have been restored through projects financed primarily by the SWFWMD’s Surface Water & Management (SWIM) program and the Florida Department of Environmental Protection’s Pollution Recovery Trust Fund. Several projects now underway and in the planning stages will boost that number by up to 1,000 acres.

Pinellas, Hillsborough and Manatee counties all have administrative programs for the public purchase of environmentally sensitive lands. Pinellas and Hillsborough counties’ programs are funded by local taxes that complement state-funded public land acquisition programs such as Preservation 2000, Save Our Rivers, and Conservation and Recreational Lands (CARL). Manatee County’s program is for the purchase of land in the Lake Manatee Reservoir and is financed by the county’s Water Utilities

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Enterprise Fund. Private land acquisition programs such as the Nature Conservancy also contribute to the preservation of upland and wetland habitats.

STRATEGY:

This action presents steps to implement the Tampa Bay Master Plan for Habitat Restoration and Protection, including elements to secure and preserve funding sources.

- STEP 1** Finalize the list of priority restoration projects compiled from the individual plans of various agencies and local governments.
Responsible parties: Tampa Bay NEP, in cooperation with the established workgroup of agencies, organizations and local governments
- STEP 2** Ensure that priorities for habitat restoration and protection are incorporated into the 1997 action plans submitted to NEP by local governments and agencies for implementation of the CCMP. Additionally, ensure that these projects are incorporated into local government and agency permit reviews and conditions.
Responsible parties: local governments, FDEP, SWFWMD, FGFWFC
- STEP 3** Direct public and private mitigation to restoration projects identified as priorities. (See Action BH-2 on mitigation banking)
Responsible parties: FDEP, SWFWMD, FGFWFC, Environmental Protection Commission (EPC) of Hillsborough County
- STEP 4** Reconvene work group every two years, beginning in 1998, to assess progress toward goals and to reevaluate priorities.
Responsible parties: Tampa Bay NEP
- STEP 5** To support implementation of restoration and protection efforts:
- Pursue a permanent source of funding for the SWIM Program;
 - Secure funding for the Florida Marine Research Institute's Marine Habitat and Restoration Program, which was discontinued recently due to state funding cutbacks;
 - Secure a permanent source of funding for Preservation 2000, the state environmental lands acquisition program;
 - Amend provisions of the Hillsborough County Pollution Recovery Trust Fund to require that monies collected from fines be spent within a reasonable period of time.

SCHEDULE:

Step 1 is ongoing with finalization of priorities anticipated in early 1997. Several restoration projects are already underway and considerable progress is being made in the area of public lands acquisition and preservation. Remaining steps will be initiated in 1997.

COST:

Implementation costs for specific projects will be included in the action plans of responsible agencies and local governments. However, existing SWIM habitat restoration projects may provide some basis for comparison. The current SWIM plan for Tampa Bay includes a total of 16 major and 15-21 smaller projects with a total budget of \$4.5 million or about \$1.5 million annually. SWFWMD cost analyses indicate that the cost for the creation/restoration of intertidal wetlands (including design, permitting, plans, construction and monitoring) range from \$30,000 (managed in-house) to \$50,000 (contracted to private firm) per acre, excluding land costs.

BH-1**EXPECTED BENEFITS:**

Implementation of this plan will improve the quality, diversity and quantity of critical coastal habitats that support bay wildlife.

MONITORING ENVIRONMENTAL RESPONSE:

Progress in implementing the habitat restoration and land acquisition master plan and in meeting specific targets for habitat recovery will be monitored by local governments and agencies and reported in a Biennial Bay Monitoring Report.

REGULATORY NEEDS:

Revisions to trust fund provisions and other regulatory changes may be necessary to ensure consistent funding for habitat restoration and acquisition.

RELATED ACTIONS:

BH-2, BH-8

Establish and Implement Mitigation Criteria for Tampa Bay and Identify Priority Sites for Mitigation

ACTION:

Establish criteria for mitigation of impacts to tidal habitats in the Tampa Bay watershed, and develop a regional mitigation banking plan that implements those criteria.

BACKGROUND:

Mitigation—the process by which applicants whose projects impact wetlands create new ones in their place or restore or enhance existing wetlands—is required of both private developers and public agencies in Florida to compensate for loss of natural habitats. Typically, these manmade wetlands are established on the same site as the project, in an area not slated for development.

But keeping track of these projects—and how closely they mimic natural wetlands—has proven difficult with the government's limited resources. Studies by the Florida Department of Natural Resources' Aquatic Preserves Division and Marine Research Institute in 1988 reported a failure rate of more than 80 percent for mitigation projects in Southwest Florida and Tampa Bay. A follow-up study conducted by the Florida Department of Environmental Protection (FDEP) revealed that one-third of applicants issued permits by the agency had never even attempted the required mitigation. Of those that had, only 13 of 62 mitigation projects were deemed "ecologically successful," meaning they generally provided the same functions as natural wetlands destroyed by the project.

In addition to problems with enforcing mitigation requirements, some bay managers believe the mitigation criteria used by the state is insufficient to protect some particularly valuable bay habitats.

Problems with the current mitigation program, and pressures from private interests who view it as too cumbersome, have led to a new concept called "mitigation banking." It allows developers to compensate for wetland losses in one place by preserving, restoring or creating wetlands in another to achieve a no-net loss of wetlands.

A new FDEP rule allows mitigation banking in some instances, although it remains a controversial issue. Proponents say mitigation banking can consolidate man-made marshes into central areas, increasing the odds for success and making the permits easier to monitor and enforce. Proponents also say it will result in larger wetland areas that are more useful for birds and other wildlife than, for instance, a tiny wetland in the middle of a shopping center or along a busy road. Critics say mitigation banking will make it easier to destroy wetlands. If an applicant can simply pay to restore marshes somewhere else, they fear there will be little incentive to preserve wetlands on site. Many concerns about mitigation banking stem from provisions (or lack of provisions) in the new state rule.

Under the rule, mitigation banks are optional and can be either publicly or privately owned or operated. The state encourages a free-market approach, so does not specify how much a developer can be charged for mitigation credits. Generally, the price of credits covers the cost of the restoration and monitoring for several years, in addition to providing a margin of profit for the private restoration company. Banks are jointly administered by the FDEP and the state's water management districts.

The state rule also allows private companies to purchase lands for mitigation banks, or developers themselves to purchase and operate mitigation banks. Additionally, the new rule permits developers to transfer their mitigation to publicly owned lands if the landowner agrees, as is the case with a bank on state-owned property at Little Pine Island in Lee County.

Whether mitigation banks should be permitted on publicly owned lands is a key area of disagreement among bay managers. Some believe mitigation should only be allowed on private lands, with those lands subsequently turned over to a public agency for management. Others say mitigation banking offers a chance to restore damaged public lands much faster than limited government funds currently permit.

The shortcomings of the current mitigation program and the lack of a significant track record on wetland mitigation banking will continue to make the issue of how and where banks should be used complex and controversial.

The Tampa Bay National Estuary Program (NEP) supports the development of mitigation criteria for the Tampa Bay region, including the development of a regional mitigation banking plan that addresses specific habitat needs and priorities. A workgroup of the Natural Resources Committee of the Agency on Bay Management (ABM) was convened in May 1996 to evaluate existing guidelines and develop recommendations. Participants have reviewed and compared federal, state and local criteria for mitigation banking, as a first step in developing recommendations for the Tampa Bay region. The group also is identifying areas that may be desirable for banking, based on priorities for restoration and protection established in the NEP's Master Plan for Habitat Restoration and Protection (see Action BH-1).

A regional mitigation banking plan would accomplish several goals. First, it would ensure appropriate siting of banks in areas where they are most likely to succeed and where other valuable habitats, such as mature pine forests, are not sacrificed for wetlands. A regional plan also would prevent a profusion of widely scattered banks that are difficult to monitor, and would give local governments guidance in drafting future land-use plans.

Permitting agencies should continue to emphasize avoidance of wetland impacts in lieu of on- or off-site mitigation. Where wetlands impact cannot be avoided, on-site mitigation should be encouraged if it is likely to be effective. If on-site compensation is not feasible, mitigation banking should be encouraged.

STRATEGY:

- STEP 1** Identify areas where mitigation banks should be used in the Tampa Bay watershed, and develop criteria for management and operation of those banks.
- A. Generate a map that identifies all existing and proposed preserves and major conservation easements, using the NEP's 1996 base map from the Habitat Restoration and Protection Plan for Tampa Bay and the Game & Fresh Water Fish Commission's Regional Wildlife Habitat Plan (1996). Identify areas best suited to mitigation banking.
- B. Evaluate and recommend criteria for mitigation banking in the Tampa Bay region. The ABM workgroup has considered:
- whether mitigation conducted by local governments and private developers should count toward overall habitat restoration goals for Tampa Bay. Projects which produce a net increase in valuable estuarine, oligohaline and native upland watershed habitats should "count" toward the overall restoration goals for Tampa Bay.
 - specific criteria to decide when on- or off-site mitigation is most appropriate. Recommendations being developed.
 - ownership, management and associated cost issues, including whether mitigation banks operated on private lands purchased by the developer or private bank operator should be deeded to a public agency. Recommendations being developed.
 - limitations on the total number of mitigation banks, and the number that one private operator can manage, and provisions to make banks large enough to increase ecological values and prevent a glut of banks with no "customers." Recommendations being developed.
 - siting considerations, to ensure that wetland values lost in one area are replaced in the same general area, thus preventing an overall decline in water quality or habitat within one watershed (for example, positioning banks adjacent to existing wetlands could make replicating the types of wetlands lost easier, increase its probability of success, and boost its value to wildlife). Another issue involves siting banks in areas that fill gaps in existing wildlife habitat corridors. Workgroup is evaluating FDEP language to decide if changes are needed.
 - provisions to ensure the bank mimics as closely as possible the values, appearance and function of the original habitat. Where this is not practical, mitigation credits should be granted at a higher ratio, as in low-salinity tidal streams, salt barrens, hard-bottom communities or other critical habitats within Tampa Bay. The following ratios have been presented for consideration: 2:1 (creation), 4:1 (restoration/enhancement), 10:1 (preservation). [from Scientifically Defensible Compensation Ratios for Wetland Mitigation]

- bank monitoring, enforcement and penalties for noncompliance. Recommendations being developed.
- provisions for preservation of existing wetlands within a mitigation bank as compensation if the environmental benefits of such activity will significantly exceed the level of impact. Recommendations being developed.
- whether mitigation banks should be considered a replacement for publicly financed restoration projects. Mitigation banking should not replace publicly financed restoration. However, the potential exists for some mitigation banking credits to be generated by local governments for restoration projects that produce a net habitat gain and help achieve the goals of the bay restoration plan.
- safeguards to protect productive native uplands from conversion to wetlands. The group is strongly opposed to converting productive native uplands to wetlands. Recommendations being developed.
- mandating the establishment of a trust fund to ensure long-term management of the mitigation bank. The trust fund could be managed by a public agency, with additional oversight by a non-profit group such as The Nature Conservancy. The group supports this concept. Most existing mitigation banking criteria address this issue.

Private industry and other non-governmental and environmental groups have been urged to participate. Recommendations will be forwarded to the Tampa Bay NEP in early 1997 following review by the full Agency.

Responsible parties: ABM

- STEP 2 Implement recommendations from Step 1, and direct mitigation of estuarine impacts to high-priority restoration areas identified in the Tampa Bay NEP Habitat Restoration and Protection Master Plan. (See Action BH-1)
- Responsible parties: Tampa Bay NEP, in conjunction with U.S. Army Corps of Engineers, FDEP, Southwest Florida Water Management District, Florida Game & Fresh Water Fish Commission, Environmental Protection Commission of Hillsborough County and local governments***

SCHEDULE:

Step 1 is underway with recommendations to be provided to NEP in early 1997. Step 2 can be initiated in 1997.

COSTS:

To be determined, based on recommendations of the workgroup.

EXPECTED BENEFITS:

Effective mitigation banking can consolidate manmade wetlands into central areas, increasing the odds for success and making permits easier to monitor and enforce. It

BH-2

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also can result in larger wetland areas that are more useful for birds and other wildlife. The development of specific criteria for mitigation banking in the Tampa Bay region will help assure that mitigation banking is conducted in the most environmentally beneficial manner.

MONITORING ENVIRONMENTAL RESPONSE:

Wetland habitats are monitored every five years using photo interpretation. The success of mitigation banks will be monitored through permits.

REGULATORY NEEDS:

Possible amendments to local permitting rules and/or the state mitigation banking rule.

RELATED ACTIONS:

BH-1

Reduce Propeller Scarring of Seagrass and Pursue Seagrass Transplanting Opportunities at Select Sites

BH-3

ACTION:

Reduce propeller scarring of seagrasses and other shallow marine habitats through boater education and by installing channel markers in appropriate areas to direct traffic. Additionally, pursue seagrass transplanting opportunities at select sites to assist natural seagrass recovery efforts.

BACKGROUND:

Boating activity on Tampa Bay is intense and increasing — along with damage to seagrass meadows and other sensitive marine habitats. Nearly 100,000 boats are registered to anglers and boating enthusiasts in the three counties bordering the bay, along with dozens of smaller commercial fishing vessels.

Propeller scars from boats that cut through shallow seagrasses beds or run aground can leave sandy trenches that may stay barren for years. Seagrasses in some sections of Tampa Bay — including portions of Cockroach Bay Aquatic Preserve, Fort DeSoto Park, Bishops Harbor, Rattlesnake Key and the Double Branch/Rocky Creek portion of Upper Tampa Bay — are severely scarred, particularly around narrow channels and passes.

Additionally, turbidity created when jet-powered personal watercraft repeatedly stir up the bottom sediments in shallow areas of the bay may cause long-term damage to grass beds.

The Florida Marine Research Institute (FMRI) recently completed a study for NEP investigating methods to protect seagrasses in heavily scarred areas of Tampa Bay. FMRI also conducted extensive mapping of seagrass scarring in the bay and evaluated management methods used through the state. Their recommendations are to install channel markers in Miguel Bay and Bishops Harbor in Manatee County and at Tierra Verde in Pinellas County, along with interpretive signage at boat ramps and near grass beds. The NEP approved \$30,000 in 1996 to fund these projects.

Boating restriction zones have been established at Cockroach Bay Aquatic Preserve in Hillsborough County and Fort DeSoto Park, Weedon Island State Preserve and Honeymoon Island State Park in Pinellas County, and monitoring is underway to evaluate the effectiveness of various management methods. These range from motor boat exclusion and restricted access areas to unrestricted areas where sensitive grass beds are posted with interpretative signs. Channel marking and education appear to be the most cost-effective techniques for reducing prop scarring.

Interpretive signs at high-use boat ramps around the bay can help to raise boater awareness of sensitive seagrass meadows and emphasize the importance of using

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marked channels to avoid damaging grass beds. Expanding this effort to other areas of intense use is another important strategy advocated by the NEP. The Boater's Guide to Tampa Bay also is an excellent educational tool. More than 100,000 guides have been distributed to boaters in the bay's three surrounding counties since its first printing in 1992. An updated version of the Boater's Guide, which is produced by the Tampa Bay NEP and FMRI, will be available in March 1997.

Seagrass transplanting also should be pursued at select sites to assist natural seagrass recovery efforts, which can take up to 10 years for some species. Pioneering efforts by scientists at the FMRI to culture plant fragments in the laboratory for transplanting in the bay show promise, although the process is lengthy and expensive. Use of "donor" grasses transplanted from existing meadows may be a more cost-effective approach and has already been successful in some areas of the bay. The NEP will evaluate suitable areas for smaller-scale projects as part of the overall seagrass restoration strategy.

STRATEGY:

STEP 1 Install channel markers and interpretive signs at Bishops Harbor, Tierra Verde and other priority sites where boating or personal watercraft activity pose a threat to seagrasses.

Responsible parties: local governments, with funding assistance from the Tampa Bay NEP

STEP 2 Continue to monitor seagrass scarring and protection methods to evaluate impacts, recovery and opportunities to reclassify restricted areas.

Responsible parties: local governments and FMRI

STEP 3 Pursue seagrass transplanting opportunities at suitable sites to enhance natural seagrass recovery efforts.

Responsible parties: FMRI, NEP, Tampa Bay Watch

STEP 4 Expand distribution of the Boater's Guide to Tampa Bay at boat shows and through major marinas, boating and fishing clubs, retail outlets and boat ramps.

Note: More than 100,000 Boater's Guide have been distributed in the three counties bordering the bay. Reprints of the Boater's Guide with new and updated information will be available in March 1997.

Responsible parties: FMRI and NEP, with assistance from Florida Marine Patrol, Coast Guard Auxiliary, Tampa Bay Watch, Florida Sea Grant Extension Program

STEP 5 Identify high-use boat ramps not already posted and design and install interpretive signage in these areas to educate boaters and personal watercraft users about bay habitats and their role in habitat protection. Ideally, sign design should be uniform throughout the watershed to maximize cost-efficiency and impact.

Responsible parties: FMRI, with assistance from local governments and Tampa Bay Watch

STEP 6 Finalize and distribute a boat decal on prop scarring to boaters, boat rental and sales outlets, and tackle shops.

Responsible parties: Tampa Bay NEP (for design and initial production), FMRI, Tampa BayWatch, Florida Marine Patrol and local government marine units and tax collectors' offices (for distribution)

Note: Preliminary designs for a boater decal have been developed by the Tampa Bay NEP.

BH-3**SCHEDULE:**

Step 1 will be implemented in 1997 with funding from the Tampa Bay NEP. Steps 2-4 are ongoing. Steps 5 and 6 will be initiated in 1997.

COST:

The costs to install channel markers and interpretive signage in areas identified in Step 1 is approximately \$15,000 per site. Funding for these projects will be provided by the NEP. The cost of transplanting seagrasses varies considerably, from about \$1.50 to \$2 per unit of seagrass. On average, transplant costs are estimated to be about \$200 a day, based on two people working eight hours and transplanting between 100-200 units.

EXPECTED BENEFITS:

Targeted efforts to educate boaters, coupled with channel marking and enforcement of management zones, will reduce prop scarring of seagrasses. Other sensitive bird and coastal habitats also will benefit as boaters become aware of how to protect them.

MONITORING ENVIRONMENTAL RESPONSE:

Prop scarring is monitored by local governments in areas where boating restrictions have been established. A responsible party for baywide prop scarring monitoring has not yet been determined. Seagrass coverage is monitored every two years by Southwest Florida Water Management District's Surface Water Improvement and Management Program.

REGULATORY NEEDS:

None anticipated.

RELATED ACTIONS:

BH-1, FW-1

Restrict Impacts to Hard-Bottom Communities in Tampa Bay

BH-4

ACTION:

Evaluate the extent of hard-bottom communities in Tampa Bay and develop special permitting and mitigation criteria to reduce impacts to those communities.

BACKGROUND:

The vast majority of the submerged bay bottom in Tampa Bay is characterized by loose sediments such as sand or mud. Subtidal hard-bottom, or live-bottom, communities exist in sparse areas of the bay bottom where natural rock outcrops protrude into the overlying water column. The hard surface of the rock provides an ideal substrate for colonization by a diverse assemblage of marine invertebrates including sponges, gorgonians and corals, and the shelter afforded by the rock outcrops attracts large numbers of a wide variety of fishes. These characteristics make hard-bottom communities among the most unique and highly productive natural habitats in Tampa Bay.

Hard-bottom communities are known to exist in Old Tampa Bay near Rocky Point and the Gandy Bridge, as well as southwest of the Skyway Bridge near Terra Ceia Bay. However, the baywide distribution of these important habitats — particularly in deeper waters — remains undocumented.

Oyster reefs are another type of hard-bottom community found in Tampa Bay. They typically occur in shallower waters along the shoreline, predominantly within the intertidal zone and provide a unique substrate for other encrusting organisms. Relatively little is known about the distribution and health of Tampa Bay oyster reefs despite their recognized importance and potential economic value.

The new state Environmental Resource Permit typically requires permittees to provide compensatory mitigation (e.g., wetland creation, restoration, enhancement) for permitted wetland impacts after the impacts have occurred. The amount of mitigation required is based upon guidelines for the ratio of impact acreage to mitigation acreage, but is usually negotiated on a case-by-case basis. Current rules, however, do not distinguish estuarine hard-bottom communities from other types of regulated wetlands and submerged bottom types. Consequently, these unique habitats are typically not afforded any additional regulatory protection — except in the Florida Keys, where a model rule expanding protection of that area's unique seagrasses, microalgae and corals has been developed. While it is not clear how many acres of natural hard-bottom communities have been lost in Tampa Bay, it is clear that impacts to these unique habitats are not easily mitigated, and that greater recognition and protection is needed.

This action would provide for the identification of hard-bottom communities in the bay through a comprehensive survey, and subsequent protection of identified areas through the development of special permitting and mitigation criteria. The additional protections could be achieved either through statewide rulemaking or amendments, or through adoption of local rules or policies specifically targeting Tampa Bay.

BH-4**STRATEGY:**

STEP 1 Undertake a comprehensive benthic survey of Tampa Bay with the objective of mapping the detailed distribution of natural hard-bottom communities, including both oyster reefs and rocky outcrop live-bottoms. A small-scale survey of hard-bottom communities has been completed, but a more detailed investigation is needed. The survey would document the species composition and ecology of natural hard-bottom communities and compare them to artificial reef communities, which often are used to mitigate impacts to live-bottom communities. The Environmental Protection Commission (EPC) of Hillsborough County could assume this task as part of its annual benthic sampling program in Tampa Bay, if additional funding is secured. Volunteers also could be utilized to survey shallow-water hard-bottoms such as nearshore oyster reefs. Ensure the distribution of resulting maps to applicable regulatory agencies and local governments so that these areas are recognized in permitting decisions.

Responsible parties: Florida Department of Environmental Protection (FDEP), EPC, Tampa BayWatch, Florida Sea Grant Extension Program

STEP 2 Evaluate the effectiveness of current permitting and mitigation rules in preserving hard-bottom habitats, and recommend ways to provide increased protection. (This process should be integrated with development of special mitigation criteria for Tampa Bay as directed in Action BH-2) The advisory group may wish to use the Florida Keys model rule as a starting point for comparison. Additionally, the group should explore whether regulatory agencies already have authority to adequately protect live-bottom habitats, or whether new statewide or local rules, or expansion of existing rules, is needed.

Responsible parties: Agency on Bay Management (ABM)

STEP 3 Implement the ABM recommendations regarding the protection of specific hard-bottom habitats.

Responsible parties: FDEP (if state rule changes are deemed necessary) or local governments

SCHEDULE:

Step 1 can be initiated in 1998. Step 2 can be accomplished in 1998, with recommendations forwarded to the Tampa Bay NEP and FDEP by the end of that year.

COST:

The benthic survey could be conducted for approximately \$50,000-\$100,000. Financing options include Florida Sea Grant, local governments and research funds available through Florida Salt Water Fishing License revenues.

EXPECTED BENEFITS:

More effective protection of natural hard-bottom communities in Tampa Bay.

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MONITORING ENVIRONMENTAL RESPONSE:

The bay monitoring program will include a hard-bottom mapping element, to be updated periodically (every 10 years).

REGULATORY NEEDS:

Possible amendments to Chapters 62-312 and 40D-4, FAC.

RELATED ACTIONS:

BH-1, BH-2, BH-8

Improve Management of Parking and Vehicle Access Along Causeways and Coastal Areas

ACTION:

Improve management of parking and vehicle access along environmentally sensitive areas of bay causeways and coastal areas.

BACKGROUND:

The sandy shoulders along the bay's causeways have become popular impromptu recreation spots. On any weekend, the "beaches" along the Gandy and Courtney Campbell causeways, the Pinellas Bayway and the approach to the Sunshine Skyway Bridge are packed with cars, people, jet-powered personal watercraft and dogs.

Most of these makeshift beaches along the bay have no parking or sanitary facilities and few restrictions on use. Vehicles travel up and down the shoreline, eroding it and preventing emergent vegetation from growing. On the Gandy Causeway, the Florida Department of Transportation (FDOT) periodically dumps and grades new sand on the access area, but much of it is washed into the water by the constant traffic.

At all the sites, people have carved paths through mangroves in order to park right on the edge of the bay. Mangroves also are "trimmed" by beachgoers for campfires. Lack of sewage and trash facilities pose aesthetic and water quality problems for the bay, while the varied and often incompatible activities that occur there (i.e., personal watercraft users sharing a relatively limited space with swimmers and anglers) often present a safety concern.

No information exists on exactly how many people visit these areas, but observations indicate that hundreds use these areas every weekend, especially during the spring and summer.

At the request of the Tampa Bay NEP, the Agency on Bay Management (ABM) has identified four areas along Tampa Bay where improvements in traffic and parking would improve the safety of beachgoers and reduce the environmental damage done to these areas, while still allowing people to enjoy the shoreline. Recommendations include the installation of bollards — short wooden or cement poles planted vertically in the ground close together — to keep vehicles out of environmentally sensitive areas. These areas, and specific management recommendations, are as follows:

• Gandy Causeway

On the southern shoreline, ABM recommends installing bollards along the future FDOT access road to allow parking but prevent vehicles from driving near mangrove areas. The bollards will protect the mangroves that currently exist and allow for growth of new intertidal plants.

Unrestricted parking will still be available at the western end for the private boat ramp and restaurant, and all along the eastern sandy shore area — which is the most popular gathering place for beachgoers.

 **BH-5**

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Bay Habitats

On the northern shoreline, ABM recommends placing bollards along the roadway to prevent vehicles from pulling off the road and into mangrove areas. This action would guard against an increase in off-road traffic in this area once FDOT completes removal of Brazilian pepper trees there.

• **Fourth Street at I-275**

ABM recommends lining both sides of the causeway with bollards above the jurisdictional line. This will allow vehicle access along the causeway and foot access down to the water, while preventing vehicles from entering the mangrove fringe or high marsh areas. Ideally, this project should be timed to coincide with the Gandy bollard project, to prevent a shift in beach traffic from Gandy to Fourth Street.

• **Pinellas Bayway/Tierra Verde**

ABM recommends placing bollards above the jurisdictional line on the northern side of the Bayway, between the first bridge and the golf course. This project would prevent vehicle intrusion into wetland areas, while still permitting vehicles to pull off the road and park. Bollards also should be placed across the sand spits on either side of the bridge to keep vehicles out, but allow personal watercraft, sailboards and other recreational equipment to be carried or pulled to the water's edge. A similar bollard barrier should be placed as needed along the causeway approach to Fort DeSoto Park.

• **Sunshine Skyway Causeway**

ABM recommends installing bollards above the jurisdictional line on the south side of the causeway across from the Blackthorne Memorial. Windsurfers and personal watercraft users will still be able to carry or pull their equipment to the water's edge. ABM also suggests that consideration be given to installing bollards on either side of the two short bridges along the Skyway approach.

If additional management of these areas is desired, sanitary and trash facilities, security lights and picnic facilities could be installed. Mangroves and marsh grass could be planted to revegetate sections of the shoreline, and a small fishing pier or boardwalk could discourage foot traffic through these vegetated areas.

Limiting access to these areas will be the responsibility of whoever maintains the road or causeway. In most cases, that will be either the FDOT or a county transportation department. Enforcement would be provided by local law enforcement agencies. Possible sources of funding for the improvements include federal and state grants (such as FDOT's Intermodal Surface Transportation Efficiency Act [ISTEA] grant program) and local governments. Local utility companies also may be willing to provide bollards at no cost.

STRATEGY:

STEP 1 Obtain local and state approval of the management recommendations developed by the ABM. The ABM recommendations are expected to be considered by Pinellas County and the Tampa Bay Regional Planning Council (TBRPC) in late 1996, and then submitted to the FDOT shortly afterwards.

Responsible parties: ABM in cooperation with the TBRPC, FDOT and applicable local governments

- STEP 2** Implement restrictions on designated causeways and coastal roads. A pilot project at a single site could be implemented first, to gauge public reaction and effectiveness. Other sites could follow, drawing upon the lessons learned at the test site. One site that might serve as a test area is the Pinellas Bayway/Tierra Verde approach to Fort DeSoto Park, where improvements would facilitate increased protection of the park's outstanding resources.

Responsible parties: FDOT, local government transportation departments

- STEP 3** Develop and implement a recreation plan for causeway beaches that enhances the environmental integrity of the areas while still allowing passive recreation. The plans could include sanitary and trash facilities, boardwalks and habitat restoration components. This is an optional step that depends heavily upon availability of local government funding, although some components—such as shoreline cleanups and habitat restoration projects—could be accomplished with volunteer labor.

Responsible parties: local government parks and transportation departments, volunteer groups such as the Bay Area Environmental Action Team and the Bay Conservation Corps of Tampa Bay Watch.

SCHEDULE:

Steps 1 and 2 can be implemented in 1997, following approval of recommendations. Other sites could follow in 1998, with a detailed causeway recreation plan developed in future years as funding becomes available.

COST:

Implementation varies considerably according to how extensive the measures are. The cost of installing bollards in designated parking areas is approximately \$32 per bollard. At least 20-30 bollards would be needed at most sites, for a total cost of about \$1,000 per site. That cost could be significantly lower if utilities provide bollards free of charge. Implementing a full-scale recreational facility, with restrooms, picnic tables and other amenities would cost a minimum of \$100,000 per site, with annual operating expenses estimated at as much as \$80,000, based on two full-time staff people, one vehicle, regular trash pickup and other services.

EXPECTED BENEFITS:

Controlling vehicle access will permit emergent vegetation to recolonize now-barren areas of the bay shoreline, improving fish and wildlife habitat, reducing erosion and adding to the aesthetic appeal of the bay.

MONITORING ENVIRONMENTAL RESPONSE:

Any marsh or mangrove plantings conducted at the sites will be monitored by the appropriate state or local agency.

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REGULATORY NEEDS:

None anticipated. Enforcement of the vehicle access restrictions can be accomplished under existing local ordinances.

RELATED ACTIONS:

BH-1

Encourage Waterfront Residents to Enhance Shorelines and Limit Runoff from Yards

ACTION:

Encourage waterfront residents to enhance or naturalize shorelines and limit runoff from yards.

BACKGROUND:

About half of Tampa Bay's natural shoreline has been altered by development or hardened through the construction of seawalls, piers and jetties that limit plant and animal life. These changes have led to significant declines in intertidal marsh and mangrove habitat, which supply food and shelter for marine creatures and filter pollutants contained in runoff.

This action presents steps to encourage waterfront residents to soften or enhance seawalls and degraded natural shorelines with native vegetation, limestone rip-rap, terracing or habitat reefs. When properly designed, these improvements not only benefit the environment, but also can boost property values by improving shoreline stability and aesthetic appeal. However, cost, permitting complexity and lack of information about suitable options are often key deterrents to homeowners, who also are limited by site-specific considerations.

Currently, residents who wish to stabilize their shoreline may need to obtain a general permit to install rip-rap or to soften existing structures, but the criteria for obtaining this permit vary according to the nature of the surrounding shoreline and the type and amount of work proposed. Exempting certain types of enhancement activities from the permit requirement, or mandating only that the homeowner notify Florida Department of Environmental Protection (FDEP) of the work — a noticed exemption — may encourage more residents to undertake these projects.

Local communities seeking to encourage waterfront residents to enhance shorelines may gain the most by targeting larger, finger-fill communities, where group permits are feasible, especially when seawalls are replaced or repaired. The City of Clearwater's Environmental Advisory Board, for example, has discussed the possibility of allowing homeowner groups to adopt a management plan for their shorelines to encourage the planting or preservation of mangroves. The management plan would specify mangrove trimming guidelines, and homeowners who agree to abide by the guidelines could do the pruning themselves, instead of having to hire a landscape architect as mandated by the current state mangrove trimming rule.

Limiting pollution in runoff from waterfront yards also is encouraged. Residents can help to reduce pollution to Tampa Bay by applying the eco-landscaping techniques prescribed by the Florida Yards & Neighborhoods (FY&N) Program, which is administered by local cooperative extension services. A companion FY&N homeowner's guide, which features low-maintenance landscape design and maintenance tips, is ideally suited to the environmentally conscious waterfront resident. Adopt-A-Canal pro-

BH-6

grams also may be effective in select areas in improving water and habitat quality in canals through public stewardship and education.

STRATEGY:

The following strategy focuses on incentives and efforts to streamline procedures for residential shoreline enhancement, as well as informational resources to assist waterfront residents in evaluating shoreline options and implementing landscaping practices to reduce runoff from their yards.

- STEP 1** Develop property tax or other financial incentives to encourage habitat enhancement along seawalls, and establish cost-share programs to promote group-permit shoreline enhancement projects. For instance, property owners currently are entitled to lower property valuations if part of their property is placed in a conservation easement; perhaps a similar program could be instituted for homeowners who use alternative shoreline stabilization and enhancement techniques. Additionally, a shoreline management plan such as that proposed by the Clearwater's Environmental Advisory Board could result in significant cost-savings to participating homeowners by allowing them to trim their own mangroves under approved guidelines.
Responsible parties: local governments, Southwest Florida Water Management District (SWFWMD), in cooperation with FDEP
- STEP 2** Evaluate whether a low-cost or no-cost general permit, a noticed exemption or a full exemption is the best mechanism for encouraging shoreline enhancement, and develop criteria for review of projects that will be eligible for the streamlined permit process. Rule revisions may be needed to incorporate exemptions into existing rules.
Responsible parties: SWFWMD, FDEP, local governments
- STEP 3** Amend state statutes to require that habitat enhancement features be incorporated when seawalls are constructed or repaired.
Responsible parties: FDEP
- STEP 4** Develop and distribute a resource card (#10-envelope size) to waterfront residents through annual property tax notices to promote available tax incentives for shoreline enhancement, as well as resources and publications addressing waterfront landscaping and exotic plant control, and canal maintenance and improvement. Publications noted below should be featured.
Responsible parties: local governments and the Tampa Bay National Estuary Program (NEP) (production), local government tax assessors offices (distribution), also distribute through Tampa Bay Watch, Agency on Bay Management (ABM)
- 4.1** SWFWMD's 1993 report on Best Management Practices for Improvement of Residential Canals includes informative boilerplate text for a public brochure on enhancement of hardened shorelines. Text should be expanded to provide more detail on general shoreline design options, associated costs, and appropriate contacts, and then produced as a brochure for public distribution.

Responsible parties: SWFWMD (brochure), SWFWMD and local governments (distribution), Florida Sea Grant Extension Program

- 4.2 The FY&N Handbook, produced by the Florida Cooperative Extension Service (FCES) and the National Estuary Programs of Tampa Bay and Sarasota Bay, assists residents in designing and maintaining low-maintenance, environmentally beneficial Florida Yards, which minimize fertilizer, pesticide and water use. Special sections are devoted to waterfront landscaping, shoreline enhancement and septic tank maintenance. Local governments may arrange for reprints of this publication through FCES or refer inquiries to local cooperative extension services.

Responsible parties: local governments, FCES

- STEP 5 Explore the costs and benefits of implementing Adopt-A-Canal programs in areas with strong neighborhood associations. Include existing materials as core of a curriculum, but also promote proper boat maintenance and oil-sorb products for boat bilges. Encourage backyard maintenance-free (or low-maintenance) buffer zones to limit fertilizer and pesticides in direct runoff.

Responsible parties: local governments, Florida Sea Grant (Marine Extension agents)

SCHEDULE:

All projects can be initiated in 1997 for implementation in 1998. Incentives and cost-share options will be investigated by the Tampa Bay NEP, which also will develop boilerplate design and text for the resource card (Step 4) to provide to local governments.

COST:

NEP is investigating costs to produce: 1. Resource card-100K quantity, #10 envelope-size color cardstock, printed 2 sides/1 color; 2. Brochure on shoreline options, 25K quantity, first run.

Reprint costs for the FY&N handbook are \$1 per book. Local governments can recoup expenses by providing these materials at cost of production as an alternative to free distribution.

Financial incentives and cost-share programs may be pursued through existing ad valorem taxes, river basin boards and local governments.

EXPECTED BENEFITS:

Improved shoreline habitat and water quality and associated increases in fisheries.

MONITORING ENVIRONMENTAL RESPONSE:

Existing bay monitoring programs will track trends in water quality and habitats. Environmental response also may be assessed by monitoring group permits for shoreline enhancement.

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REGULATORY NEEDS:

Possible amendments to state statutes governing dredge and fill activities.

RELATED ACTIONS:

SW-1, BH-1

Improve Compliance with and Enforcement of Wetland Permits

BH-7

ACTION:

Improve compliance with and enforcement of permits governing wetland mitigation by establishing level-of-service targets, providing periodic performance assessments, and continuing efforts to coordinate permitting and enforcement staff to provide greater continuity in oversight.

BACKGROUND:

State rules regarding mitigation for wetland impacts have been developed to offset wetland losses. However, a study of mitigation compliance completed by the Florida Department of Environmental Regulation — now Florida Department of Environmental Protection (FDEP) — in 1992 concluded that the majority of mitigation projects had either never been constructed or failed to comply with the terms of their permit and did not function properly. The generally low success rate statewide has been largely attributed to staffing shortfalls and organizational structures that have traditionally segmented rather than integrated permitting, compliance monitoring and enforcement functions. Without strong compliance monitoring and enforcement, regulated interests often have little incentive to perform compensatory mitigation in a manner consistent with the rules.

Wetland mitigation rules are administered by the FDEP, Southwest Florida Water Management District, and by local governments with delegated or legislative authority for wetland permitting.

Non-compliance with wetland mitigation permits in the Tampa Bay watershed has likely contributed to a net loss of both freshwater and tidal wetlands. However, documenting these trends has been extremely difficult because efforts to track compliance between and within various regulatory agencies have been inconsistent and lacking in sufficient detail. Inconsistent mitigation ratios, wetland delineation criteria, and design and performance standards have further complicated efforts to assess results.

Improving permit compliance will require that agencies focus first on recognizing and permitting effective mitigation designs, as well as increasing inspections during and after construction, and following up to promote better project maintenance by regulated interests. Access to mitigation sites also is a factor. In this regard, locally administered programs may have an advantage over state or regional programs, although the costs of absorbing these additional responsibilities may be an obstacle.

The state's new Environmental Resource Permitting (ERP) program, which consolidates existing wetland resource, management and storage of surface waters, and sovereign lands regulatory programs into a single permitting function, is expected to improve compliance monitoring and enforcement by increasing interagency coordination and reducing inconsistencies and duplication. Implementation of the ERP will create key opportunities for the consolidation and reorganization of these functions within regulatory agencies and participating local governments, and the creation of

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uniform standards for wetland delineation. Additionally, the Environmental Protection Commission (EPC) of Hillsborough County is currently developing a Memorandum of Understanding with SWFWMD which will allow EPC to conduct all wetland compliance and enforcement tasks within Hillsborough County. This agreement would result in more timely and consistent reviews of mitigation projects, while eliminating duplication of services and the potential for conflicting compliance criteria.

STRATEGY:

The strategy to improve wetland permit compliance monitoring and enforcement focuses on establishing level-of-service targets, continued implementation and periodic assessment of integrated permitting concepts advanced through the ERP program, and evaluation of existing staffing and funding resources and needs as the basis for recommendations for action. This strategy also calls for standardization of monitoring and reporting requirements within and between enforcing agencies and municipalities.

- STEP 1** Conduct a workshop to establish level-of-service targets for wetland permits (performance criteria and monitoring requirements) and compliance monitoring and enforcement within the Tampa Bay watershed, and assess associated staff and funding needs. In establishing level-of-service targets, participants should explore how principles of ecosystem management — which emphasize overall environmental benefits to the watershed — can be integrated into permitting and compliance programs. Additionally, they should evaluate ways to standardize reporting and monitoring methods between and within agencies.

Recommendations of actions to improve compliance monitoring and enforcement shall be submitted by the group to the Tampa Bay NEP by September 1997.

Responsible parties: FDEP and SWFWMD (to organize workshop); participants to include U.S. Army Corps of Engineers (USACOE), EPC, U.S. Fish & Wildlife Service (USFWS), Florida Game and Fresh Water Fish Commission (FGFWFC), and local governments requiring mitigation through local permitting or seeking delegated authority for wetland permitting

- STEP 2** Expand agency and local government permitting staff training and regular retraining to increase the emphasis on recognizing quality wetland mitigation designs as a first step to ensure that quality projects are permitted. The FDEP's statewide mitigation coordinator may be able to assist in organizing regular regional training seminars.

Responsible parties: FDEP and SWFWMD, USACOE, EPC, USFWS, FGFWFC, applicable local governments

- STEP 3** Continue to integrate permitting and compliance monitoring and enforcement functions in an effort to maximize efficiency and provide "cradle to grave" permit oversight, in which the same personnel that conduct permit reviews also are responsible for compliance follow-up. Also, encourage interagency compliance monitoring teams where feasible, including federal agencies.

Responsible parties: FDEP, SWFWMD, EPC, USFWS, FGFWFC, applicable local governments

- STEP 4 Based on recommendations from Step 1, standardize mitigation success criteria as well as monitoring and reporting requirements for created and restored wetlands.

Responsible parties: FDEP, SWFWMD, EPC, USFWS, FGFWFC, applicable local governments

- STEP 5 Assess the effectiveness of efforts to improve compliance monitoring and enforcement in the Tampa Bay watershed, including progress toward level-of-service targets (particularly compliance rates), results of integrating staff to assist in these efforts, and associated costs to agencies and applicants. Results of the assessment should be reported in the Tampa Bay NEP's Biennial Environmental Monitoring Report and the Agency on Bay Management's State of the Bay report.

Responsible parties: FDEP, SWFWMD, EPC, USFWS, FGFWFC, applicable local governments

SCHEDULE:

A preliminary "scope" for the workshop is requested by May 1997. Recommendations from the workshop are due September 1997. Implementation of Steps 3 and 4 can begin in 1997.

COST:

Only staff time is anticipated in the implementation of this strategy, although recommendations from Step 1 may call for additional resources or changes in existing allocations. For instance, additional training of wetlands permitting and enforcement personnel is estimated at \$50,000 a year for the first five years of the program, and \$25,000 after that.

EXPECTED BENEFITS:

Improved permit compliance monitoring, enforcement and reporting.

MONITORING ENVIRONMENTAL RESPONSE:

See Step 5.

REGULATORY NEEDS:

Improved coordination of permitting, compliance and enforcement can be accomplished without rule revisions.

RELATED ACTIONS:

N/A

BH-7

BH-8

ACTION PLAN

Bay Habitats

Expand Habitat Mapping and Monitoring Programs

ACTION:

Ensure implementation of adequate habitat mapping and monitoring programs to track trends in areal extent and quality of seagrass, mangroves, coastal marshes and oligohaline habitats in Tampa Bay over time.

BACKGROUND:

A critical element of the bay's management plan is the establishment and maintenance of a monitoring program to measure progress toward meeting the goals of the Tampa Bay National Estuary Program (NEP). This is very important to the local and state governments implementing actions, since counties, cities and state agencies must have adequate information to evaluate whether efforts spent on pollution abatement or other changes in the watershed are reflected in improvements in bay quality. Monitoring of habitats is also necessary to track progress toward reaching long-term restoration and protection goals set by the program, and provide essential information that can be used to redirect and refocus the plan.

One of the first efforts of the Tampa Bay NEP was to initiate a multi-year effort to develop a baywide monitoring program capable of reliably measuring changes in bay quality. This plan incorporates and expands on existing programs where possible, and consists of seven major elements: water quality, benthic, seagrass, bay scallop, fisheries, coastal marshes and mangroves, and oligohaline habitats.

This action ensures implementation of habitat monitoring elements defined in the baywide monitoring plan.

STRATEGY:

STEP 1 Continue the existing Southwest Florida Water Management District-Surface Water Improvement and Management (SWFWMD-SWIM) monitoring program mapping areal extent of seagrass in Tampa Bay to track trends in areal extent and progress toward restoration goals.

The extent of seagrass coverage in all areas of Tampa Bay is currently being monitored by SWFWMD-SWIM every two years. To date, no permanent funding source for the mapping program has been identified.

Responsible parties: SWFWMD

STEP 2 Implement the Seagrass Conditions Monitoring Program as developed by the Tampa Bay NEP Technical Advisory Committee. Hillsborough County monitors seagrass conditions in Cockroach Bay, and Pinellas County conducts seagrass monitoring in Fort DeSoto Park to track rates of seagrass

scarring. The City of Tampa conducts seagrass quality monitoring in Hillsborough Bay.

SWFWMD-SWIM is conducting the second year of the Seagrass Conditions Monitoring Program throughout the bay as a pilot project. Potential entities responsible for conducting biannual seagrass conditions monitoring in upcoming years remain to be identified.

Responsible parties: *SWFWMD, Florida Department of Environmental Protection-Florida Marine Research Institute (FDEP/FMRI)*

BH-8

- STEP 3** Continue existing annual benthic monitoring through 1996. Evaluate results of the four-year baseline in 1997 and redirect the program as appropriate. In 1996, sediment toxicity was added to the benthic community and sediment chemistry analyses.

Responsible parties: *Hillsborough, Pinellas and Manatee counties*

- STEP 4** Develop and implement a monitoring program to track habitat quantity and quality in coastal marshes, oligohaline habitats and associated uplands, as well as restored habitats.

Development of these elements of the habitat monitoring program will be initiated as part of the habitat restoration and protection master plan. This plan will identify responsible entities for implementation.

Responsible parties: *SWFWMD-SWIM is currently monitoring some of these elements. Other responsible parties may include FDEP, the Florida Game and Fresh Water Fish Commission, and local governments.*

- STEP 5** Report results and integration of environmental monitoring programs to bay managers on a regular basis, to allow for redirection and refocus of management programs as necessary.

The first Biennial Environmental Monitoring Report (BEMR) was released in 1996. Local monitoring groups evaluated progress toward implementing the baywide monitoring program in the fall of 1996. Each ongoing monitoring program is responsible for the development of a summary chapter in the BEMR. An integral element of the report will be the bay managers' summary, which will contain an integrated analysis of conditions and trends in Tampa Bay. Areas of the bay that show signs of degradation or improvement will be noted in the bay managers' summary, to allow for changes in management actions as warranted.

Responsible parties: *initial effort part of a 1995 Tampa Bay NEP project. The long-term coordinator for production of the report has not yet been determined.*

SCHEDULE:

Steps 1 and 3 are ongoing. Implementation of Step 4 began in 1996. The first biennial monitoring report was produced in October 1996 as part of an ongoing Tampa Bay NEP project.

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COST:

- Seagrass mapping: \$40,000 every two years for update
- Seagrass quality: \$36,000 every two years
- Estimated marsh/mangrove/coastal upland mapping: \$120,000 for true color and color infrared baseline maps; \$45,000 every two years for update
- Benthic monitoring: \$150,000 annually (\$115,000 from Hillsborough County, \$19,000 from Pinellas County and \$16,000 from Manatee County)
- Estimated marsh/mangrove/coastal upland quality: \$40,000 every two years
- BEMR: Production, printing and distribution costs every two years, estimated at \$10,000.

EXPECTED BENEFITS:

Implementation will provide adequate information to track trends in habitat extent and quality, and will provide managers with an "early warning system" to detect areas that may need additional management action.

MONITORING ENVIRONMENTAL RESPONSE:

Results of all bay monitoring programs will be included in the BEMR.

REGULATORY NEEDS:

None anticipated

RELATED ACTIONS:

BH-1, BH-2, BH-5

FRESHWATER INFLOW

Maintaining an adequate supply of fresh water to Tampa Bay and its tributaries is crucial to preserving the bay's health. This is especially important for rivers impounded by dams that drastically restrict those flows at certain times of the year.

FI

The bay's four major rivers and numerous smaller tributaries provide critical low-salinity habitats to dozens of species of fish and shellfish at important stages in their development. They are the primary nursery habitat for red drum, snook and striped mullet. While these dynamic habitats tend to be small, they may support many thousands of juvenile fish each year. As these fish mature, they typically move to more saline areas of the bay or out into the Gulf of Mexico, although some species return to these rivers during various seasons.

These vital ecosystems have declined as dams and development have altered the amount and timing of freshwater inflows to the bay. Additionally, many smaller creeks and streams that once served as nurseries to fish have now been channeled, filled or altered through development.

The area's largest dams, on the Hillsborough and Manatee rivers, release almost no water downstream during peak periods of the dry season; annually, they retain about 35 percent and 29 percent of their respective up-river flows for drinking, irrigation and industrial uses.

Local water supply development plans may further restrict the flow of fresh water into already impacted tributaries and bay segments. For example, the Tampa Water Resource Recovery Project would remove up to 50 million gallons per day (mgd) of fresh water currently discharged from the City of Tampa's sewage treatment plant, and possibly reduce flows to the Tampa Bypass Canal and McKay Bay. However, the project also would remove a significant source of excess nitrogen from the bay. Additionally, the West Coast Regional Water Supply Authority plans to remove 7 mgd from the Alafia River during the first phase of its 1995 Water Resource Development Plan (1995-2000).

Legislation passed in 1996 requires the Southwest Florida Water Management District (SWFWMD) to establish minimum flow requirements for priority surface waters in the northern Tampa Bay area by October 1, 1997. The District already had been working on a priority list, which includes the lower reaches of the Hillsborough River/Tampa Bypass Canal. An evaluation of the cumulative environmental impacts associated with the Tampa reuse project will be conducted as part of the effort to establish minimum flows for the Hillsborough River.

Recent studies show little overall change in the amount of fresh water entering the bay proper since the 1950s, because declines in natural flows have been partially countered by steady increases in stormwater runoff from the watershed. But some significant changes have occurred upstream in the low-salinity zones favored by the young of many of the bay's most popular fish. Declines here and associated declines in fisheries make preservation and restoration of remaining low-salinity habitats vital.

ACTION PLAN

Strategies to preserve and restore Tampa Bay's freshwater tidal streams are addressed in the Tampa Bay NEP's master plan for habitat restoration, which was finalized in 1996 (see BH-1). The following action focuses on establishing seasonal freshwater inflows to the bay from rivers impounded by dams.

GOALS FOR FRESHWATER INFLOW

- Maintain optimal freshwater inflows to Tampa Bay and its tributaries.
- Establish and maintain minimum seasonal freshwater inflows for rivers impounded by dams: Hillsborough River, Manatee River, Braden River and Palm River.

ACTION TO ADDRESS FRESHWATER INFLOW

- FI-1 Establish and maintain minimum seasonal freshwater flows downstream of dams.

Establish and Maintain Minimum Seasonal Freshwater Flows Downstream of Dams

ACTION:

While safeguarding water supply and flood control functions, establish and maintain minimum seasonal freshwater inflows downstream of dams on the Hillsborough, Manatee and Braden rivers, and below Control Structure S-160 on the Palm River, to restore and preserve the biological productivity of the estuary's critical juvenile fisheries habitats.

BACKGROUND:

Estuaries, where fresh water and salt water mix, are highly productive natural habitats for fish and other marine life. The juveniles of many aquatic species, including spotted seatrout, snook, red drum and tarpon, depend on the low- and medium-salinity portions of these shallow waters, especially in the tidal sections of rivers and streams. However, the productivity of these habitats as nurseries and feeding areas depends largely on maintaining an adequate supply of fresh water upstream at certain times of the year.

In this region, potable water for drinking, irrigation and industrial uses comes from reservoirs and from groundwater sources. Demand for fresh water in the tri-county area is expected to increase from 544 million gallons per day (mgd) in 1990 to 765 mgd in 2020, according to Southwest Florida Water Management District (SWFWMD).

Florida Statutes Section 373.042 (1991) directs the state's water management districts to establish "minimum flows" for watercourses and "minimum levels" for surface waters and aquifers. The statute defines minimum flows as the limits at which further withdrawals would be "significantly harmful to the water resources or ecology of the area." Legislation passed in 1996 requires the District to set minimum flows for priority surface waters in the northern Tampa Bay area by October 1, 1997.

Minimum flows based on river ecology have not yet been set for the Hillsborough, Palm and Braden rivers. A preliminary minimum flow of 0.425 cubic feet per second (cfs) — or roughly 275,000 gallons per day which is the current estimated leakage from the dam — was set for the Manatee River in 1991. The flow's adequacy is now being examined by SWFWMD in cooperation with Manatee County.

Minimal flows were not required when control structures were constructed on the Hillsborough, Palm, Braden and Manatee rivers (all prior to 1972). Nevertheless, a series of ongoing and recently completed studies should provide SWFWMD with sufficient information to set thresholds for each river to protect the productivity of the river and the bay downstream of the dams.

A minimum flow study is not planned for the Alafia River because the SWFWMD Needs and Sources Study concluded that water supplies were not needed from the

FI-1

FI-1

ACTION PLAN

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Alafia for the 1990-2020 planning horizon. However, the West Coast Regional Water Supply Authority (WCRWSA) has recently proposed to remove 7 mgd of fresh water from the Alafia in the first phase of its 1995 Water Resource Development Plan (1995-2000).

Studies on the Braden, Hillsborough, Manatee and Little Manatee rivers, and the Tampa Bypass Canal, have addressed various aspects of river flow and ecology. Evaluation of these studies will provide vital information in establishing minimum flow requirements.

STRATEGY:

This action is to evaluate and set minimum seasonal freshwater inflows to Tampa Bay from rivers impounded by dams to protect the ecological integrity of vital downstream fisheries habitats.

STEP 1 Conduct technical workshops for each impounded river to evaluate results of freshwater studies and develop recommendations for minimum freshwater flow requirements.

At the request of SWFWMD, the Tampa Bay NEP convened an advisory committee in October 1996 to assist in establishing flow requirements for the Hillsborough/Palm River system by October 1997.

NEP also sponsored an initial workshop on the Manatee River in August 1995, which included local government and agency representatives, scientists, engineers, utilities and community interest groups.

In evaluating available studies, participants are considering:

- whether flows to the downstream portions of impounded rivers have been quantified
- if appropriate flows to restore and maintain critical low-salinity habitats can be determined from the studies
- the impacts of various flow-release scenarios on public water supplies and economic development.

Responsible parties: Tampa Bay NEP, SWFWMD and local governments

STEP 2 Establish seasonal flow requirements by the state-mandated deadlines for the Hillsborough, Palm, Manatee and Braden rivers, incorporating recommendations from advisors in Step 1 and considering other socio-economic and environmental factors.

Responsible parties: SWFWMD

STEP 3 Implement minimum seasonal flows. Implementing parties may evaluate various options for meeting minimum flow requirements, including water conservation to reduce demand on impounded water; augmentation of well-fields or reservoirs with highly treated wastewater or stormwater, as long

as public health concerns are addressed; and relocating point source discharges to augment freshwater flows downstream of dams.

Responsible parties: *local governments, WCRWSA*

- STEP 4** Monitor the environmental response. Develop and implement a program to determine spatial and temporal changes in water quality and in-stream biology in response to these limits, perhaps by expanding local government water quality and benthic monitoring programs to address these monitoring needs.

Responsible parties: *To be determined (possibly permit applicant)*

FI-1**SCHEDULE:**

Ecological assessment studies are now being conducted as a permit condition for water use withdrawals. SWFWMD will evaluate withdrawal rates and recommended minimum flows for each river according to the following state-mandated schedule:

Hillsborough River/Palm River	October 1, 1997
Manatee, Little Manatee and Braden rivers	1999

COST:

Steps 1 and 2 require administrative and staff time. Associated studies are financed by the local governments seeking permits for water withdrawals. Costs to comply with seasonal minimum flows (Step 3) will depend on the minimum flow established. One basis for cost analysis is to compute the cost and yield for various alternative sources of water, such as construction of a new reservoir, to replace the amount of additional water released downstream.

For example, Manatee County residents now pay about \$1.62 per 1,000 gallons to have water delivered to their homes, which includes reservoir and treatment costs and a Readiness to Serve charge. To meet a 5.0 cfs freshwater flow (up from 0.425 cfs) from the existing dam would require new alternative potable water sources, with costs ranging from an additional \$.08 per 1,000 gallons for construction of a new reservoir at Gilley Creek to nearly \$.80 per 1,000 gallons for development of an off-stream reservoir. Both options would increase potable yields, in addition to allowing more water over the dam to sustain the biological needs of downstream ecosystems.

For the average Manatee County household, which uses roughly 6,500 gallons per month indoors, the Gilley Creek option would increase monthly water bills by about 4.9 percent or \$0.52 per month. For the off-stream reservoir option, monthly water bills would rise 49 percent or an additional \$5.14 per month.

The costs to monitor the environmental response to minimum flows have not yet been finalized. However, Manatee County estimates that it currently spends about \$100,000 per year to monitor water quality downstream of the reservoir, about half of the county's annual bay monitoring expenditure.

ACTION PLAN

Bay Habitats

EXPECTED BENEFITS:

Establishing and maintaining appropriate freshwater inflows to the bay from rivers impounded by dams will restore and protect vital fisheries habitat downstream of those control structures. Low-salinity portions of these tributaries are vital nursery areas for several species of fish, including red drum and snook.

MONITORING ENVIRONMENTAL RESPONSE:

Ongoing fisheries, water quality and benthic monitoring programs (summarized in Monitoring Bay Improvement) provide an overall assessment of the environmental quality of the bay and its tributaries. Water flows or release rates are recorded by Manatee County at the Lake Manatee dam on the Manatee River, and by the City of Bradenton at the Evers Reservoir dam on the Braden River. SWFWMD records flow at the Tampa Bypass Canal (Palm River), and the U.S. Geological Survey (USGS) records flow at the Hillsborough Reservoir dam.

Monitoring to detect environmental responses to new freshwater inflows set as a result of this action may be required as a condition for the renewal of water use permits.

REGULATORY NEEDS:

None anticipated.

RELATED ACTIONS:

BH-1, WW-1



*Mrs. Lemuel R. Woods
with a tarpon she caught
in Tampa Bay (1920)*

PHOTO: BURGERT BROTHERS

Fish & Wildlife

Efforts by the Tampa Bay National Estuary Program (NEP) to protect and enhance Tampa Bay's diverse fish and wildlife resources focus primarily on establishing healthy environments through improvements in water quality and habitats. But increased enforcement of existing regulations to limit physical impacts associated with fishing, boating, and foot traffic in bird rookery areas also is a priority.

Hundreds of species of marine and terrestrial animals rely on Tampa Bay and the rich tapestry of environments it provides. Mangrove islands in Tampa Bay are among the most productive nesting sites in the nation for birds such as the brown pelican, roseate spoonbill, white ibis and reddish egret. As many as 40,000 pairs of birds nest each year on these islands, which support two of the state's five largest brown pelican colonies. Other birds, such as the American white pelican and several species of sand-piper, are seasonal visitors to the bay.

Tampa Bay also attracts as many as 200 endangered manatees during the winter months, when the gentle marine mammals gather at the warm-water plumes discharged by the power plants bordering the bay. About 50-100 of these gentle giants are year-round residents. Manatee mortality has tripled in Tampa Bay from an annual average of about four (from 1976-1985) to more than 12 (from 1990-1994). Boating collisions and propeller strikes claimed about 20 percent of the 61 manatees that died in the bay during this last four-year period.

ACTION PLAN

Bay Fish & Wildlife

Three species of sea turtles — loggerhead, green and Kemp's ridley — feed in the bay, and as many as 500 bottle-nose dolphins reside here year-round. Like the manatee, these larger marine creatures are threatened by accidental boat strikes and ingestion of and entanglement by marine debris, particularly monofilament fishing line.

The bay's once plentiful supplies of fish and shellfish have declined in recent decades, a result of habitat loss and historic declines in water quality as well as pressures from overharvesting. Recent bans on purse seines and gill nets are expected to sharply reduce commercial harvesting of some species, such as spotted seatrout. While a precise figure of the historical decline is difficult to estimate, fisheries landings data show that the amount of bay finfish brought to market at local ports in Hillsborough and Pinellas counties decreased by more than 24 percent between 1966 and 1990, from 4.8 million pounds to 3.7 million pounds.

Records going back even further, to 1950, show that catches of spotted sea trout declined by 86 percent by 1990, from 487,000 pounds to 67,000 pounds. Similarly, red drum harvests between 1950 and 1986 plummeted by 81 percent, from 80,000 pounds to 15,000 pounds, although these raw landings data do not reflect changes in fishery management or quotas. Loss of seagrass habitat and overharvesting are suspected in the decline of these popular sportfish.

Recent water quality gains and associated seagrass recovery have made some bay managers hopeful that the bay may again support scallops, which disappeared from these waters more than three decades ago. While scientists can't pinpoint the cause for the collapse of the local population, they suspect declining water quality was to blame. Stocking efforts designed to jump-start a self-sustaining scallop population are now underway, primarily in the lower portions of the bay where seagrasses and salinities are most favorable.

Preserving Tampa Bay's rich fish and wildlife bounty will require continued focus on water and sediment quality, improved enforcement to minimize impacts to habitats and wildlife, and restoration and protection of habitats and food sources.

MANAGEMENT OBJECTIVES

- Increase the number, diversity and health of the bay's fish and shellfish populations, and restore a self-sustaining bay scallop population.
- Restore and protect wildlife habitats and food sources, and promote regional wildlife habitat planning.
- Minimize physical impacts to bay wildlife and habitats.

SUMMARY OF ACTIONS FOR FISH & WILDLIFE

- FW-1 Increase on-water enforcement of environmental regulations.
- FW-2 Establish and enforce manatee protection zones.
- FW-3 Support bay scallop restoration.
- FW-4 Assess the need to investigate the cumulative impacts of power plant entrainment on bay fisheries.
- FW-5 Continue and expand the Critical Fisheries Monitoring Program.

[Note: Many of the strategies to support fisheries and wildlife focus on water quality and bay habitats. Please refer to the bay Action Plans addressing Water Quality and Bay Habitats for these related actions.]

FW

Increase On-Water Enforcement of Environmental Regulations on the Bay

ACTION:

Increase enforcement of environmental regulations on Tampa Bay by obtaining support for increased allocation of Salt Water Fishing License revenues to marine law enforcement.

BACKGROUND:

Efforts by the Tampa Bay National Estuary Program (NEP) to protect Tampa Bay's diverse fish and wildlife resources have focused largely on establishing optimum water quality and habitat environments. But increased enforcement of existing environmental regulations to minimize impacts associated with fishing, boating and foot traffic in bird rookeries is also a key priority of the Program's strategic blueprint for the bay.

When the Salt Water Fishing License Rule was enacted by the state in 1989, anglers and local communities alike expected it to be a boon for local marine enforcement. The rule was established to identify and collect a user fee from saltwater anglers for the conservation and management of fishery resources. It stipulates that marine research and marine enhancement/habitat restoration shall each receive not less than 30 percent of the revenues collected, and that no more than 30 percent be allocated for marine law enforcement. Remaining revenues are split among the Marine Fisheries Commission (2.5 percent), administration (5 percent), and a state environmental education trust fund (2.5 percent).

In fact, statewide allocations for marine enforcement have averaged about 20 percent over the past five years, which is two-thirds of the 30 percent maximum allowed by law and anticipated by many supporters of the bill. Despite allocations statewide, five fewer marine patrol officers are assigned to the Tampa Bay district today than when the rule was enacted in 1989. In the first few years the license fees were collected, most of the revenues allocated to marine law enforcement were spent on capital outlay expenditures such as boats and vehicles. However, with those needs now addressed, it is possible that more of the revenues dedicated to law enforcement may be used to hire additional personnel.

Overall, the state has collected more than \$68 million since the Salt Water Fishing License Rule was enacted. Of \$11.8 million in revenues collected from saltwater fishing licenses and special stamps statewide in FY 93-94, about 17 percent or \$2.3 million was allocated by the Florida Department of Environmental Protection (FDEP) to the Florida Marine Patrol (FMP) for statewide law enforcement. It is not known how much of that allocation came back to the Tampa Bay region (FMP, District IV*), which contributed more than \$1.4 million in revenues that year.

District IV's budget has increased by only about 5 to 10 percent annually since the passage of the rule, mostly to compensate for increasing fuel prices, and declined in

FY 94-95. Requests for additional Marine Patrol officers have not been granted. Some suspect that general revenues for the Florida Marine Patrol have been depleted as saltwater fishing license revenues have been established — a “lottery syndrome” that results in few or no net increases in available funding to address resource needs.

The FMP, a part of the state’s Division of Law Enforcement, enforces state saltwater fishing regulations, boating safety rules and other wildlife and habitat protection measures. It also is the first line of defense in emergencies such as marine accidents and hurricanes, and employs a select number of special environmental enforcement officers to investigate land-based environmental crimes such as illegal dumping.

Enforcement needs are growing on Tampa Bay, which has one of the lowest ratios of marine patrol officers per registered boats — only one or two officers per shift per county for nearly 100,000 registered recreational boats. Local municipal marine enforcement units (financed in Hillsborough, Pinellas and several other counties by local boater registration add-on fees) pick up the slack in some areas, but cannot provide the coverage needed to effectively monitor the 400-square-mile bay and adjoining Gulf coastline, according to local Marine Patrol officials. Enforcement needs have increased further with the recent passage of the marine net ban.

* District IV, which includes Tampa Bay and Sarasota Bay, stretches north to Levy County, south to Sarasota County and east to Polk and Highland counties.

STRATEGY:

This strategy calls for a review of Salt Water Fishing License revenue expenditures for marine law enforcement to secure additional marine patrol officers for Tampa Bay, and possible revisions to the state Salt Water Fishing License Rule to require a minimum allocation for marine law enforcement.

STEP 1 Conduct a workshop to review allocations and expenditures of Salt Water Fishing License revenues, as well as general revenue and other related expenditures by the FDEP marine law enforcement division statewide. The workshop should explore alternatives for increasing enforcement spending — including a reallocation of Salt Water Fishing License revenues — and involve representatives of the FDEP in Tallahassee, the Agency on Bay Management (ABM) and other interested parties.

Responsible parties: *Tampa Bay NEP, FDEP, ABM*

STEP 2 Depending on the results of the workshop, pursue options for increasing environmental enforcement capabilities in Tampa Bay. If a reallocation of Salt Water Fishing License revenues is deemed the best solution, NEP may consider a formal legislative request to require that a minimum percentage of Salt Water Fishing License revenues be directed to marine law enforcement.

Responsible parties: *ABM, Tampa Bay NEP, FDEP*

STEP 3 Explore partnerships between the FMP and boat manufacturers to provide new boats to new marine officers to help maximize available dollars for

FW-1

ACTION PLAN

Bay Fish & Wildlife

marine enforcement.

Responsible parties: Tampa Bay NEP, FDEP/FMP, boat manufacturers

- STEP 4** Continue to monitor Salt Water Fishing License revenues to ensure an equitable distribution of proceeds as outlined in the original legislation. Monitoring information could be included in the Tampa Bay NEP's Biennial Environmental Monitoring Report and the ABM's annual State of the Bay report.

Responsible parties: FDEP, ABM, Tampa Bay NEP

SCHEDULE:

All steps will be initiated in 1997.

COST:

This action stresses a reallocation of existing funds, rather than new expenditures, to address environmental enforcement needs.

EXPECTED BENEFITS:

Increased enforcement of the bay's fisheries and environmental regulations will improve protection of fish and wildlife, as well as the habitats they depend upon. Efforts to bolster enforcement also send a message to resource users and anglers that existing regulations are important, and that the quality of the public's natural resource won't be sacrificed for the illegal actions of a few.

MONITORING ENVIRONMENTAL RESPONSE:

FMP can provide information annually on enforcement actions and associated benefits to the resource. District IV is encouraged to provide this information in the State of the Bay report published annually by the ABM. Additionally, information on Salt Water Fishing License revenues, and local allocations, can be included in the Biennial Environmental Monitoring report of the Tampa Bay NEP.

REGULATORY NEEDS:

Possible revisions to the state Salt Water Fishing License Rule.

RELATED ACTIONS:

FW-2, BH-3

* Revenue and salt water fishing license data provided by FDEP, August 1995

Establish and Enforce Manatee Protection Zones

FW-2

ACTION:

Enact local ordinances designating manatee protection zones in Tampa Bay.
Encourage the use of boat propeller guards throughout the bay.

BACKGROUND:

Research continues to bolster evidence that Tampa Bay is an important year-round or seasonal home to many imperiled manatees, which are protected under the federal Endangered Species Act. In fact, as many as 200 of the more than 2,600 manatees remaining in the state seek refuge in the winter at the warm-water discharges surrounding the bay's power plants. Additionally, the bay's seagrass meadows and numerous natural and manmade freshwater sources provide critical feeding and gathering areas for manatees throughout the year.

Although several no-wake areas were established in the bay for boater safety, only one — a protected area in St. Petersburg's Coffeepot Bayou — was created primarily to protect manatees. However, many communities are using boater safety zones for manatee protection.

Increases in manatee deaths associated with propeller strikes or collisions reinforce the need for more protective measures in Tampa Bay. Manatee deaths in Tampa Bay and adjacent coastal waters have risen from an average of 4.1 manatees a year between 1976 and 1985, to an average of 10.1 manatees a year from 1986 to 1994. Of the 164 manatee deaths verified in the bay area from 1976 through March 1996, 34, or 21 percent, died from collisions with watercraft.

Manatee researchers with the Florida Marine Research Institute (FMRI) have identified several areas of the bay where manatees would benefit from increased protection, based on the best available manatee population and distribution data. The areas are important as either winter refuges from cold water, seagrass feeding areas, sources of fresh water or migration routes. Among these sites are:

- warm-water outfalls of Tampa Electric Company's Big Bend power plants (winter sanctuaries)
- the warm-water outfall of Florida Power Corporation's Bartow power plant (winter sanctuary) and adjacent seagrass beds near Weedon Island (feeding area)
- Culbreath Bayou in Tampa (seagrass beds and freshwater source)
- Anna Maria Sound near Perico Island (seagrasses)
- lower Manatee River near Palmetto (fresh water and seagrasses)
- upper Braden River near Bradenton (freshwater source)

- Hillsborough River near Sulphur Springs (fresh water)
- portions of Terra Ceia Bay
- portions of McKay Bay (seagrasses)
- the mouth of the Little Manatee River up to E.G. Simmons Park (seagrass beds)
- the Rocky Point area, southwest side of the Courtney Campbell Causeway (seagrass beds)

A joint meeting of the Tampa Bay NEP and the Agency on Bay Management (ABM) was held in November 1996 to discuss the justification and ramifications of establishing manatee protection zones in Tampa Bay. Participants concluded that a formal workgroup composed of environmental officials, manatee researchers and other interested parties should be created to develop specific recommendations.

Designation of manatee protection zones could be done unilaterally by local governments, or in conjunction with rules developed by the Florida Department of Environmental Protection (FDEP). Creation of zones by local ordinance is generally faster than the state rulemaking process and should be pursued first, followed by state adoption if necessary. Once designated, maximum boating speeds and entry restrictions would be put into place for the zones. The limits might require boaters to travel at idle speeds year-round within the zones, and forbid boat entry entirely during certain times of the year such as winter, when large numbers of manatees congregate in just a few small areas. The restrictions would be periodically re-evaluated and adjusted as needed, based on updated manatee population data. Consequently, continued research into manatee movements, habitat requirements and mortality should continue.

The Florida Marine Patrol (FMP) and local marine law enforcement units would enforce the restrictions in the manatee zones. However, the amount of money allocated to FMP activities in the Tampa Bay area currently is not sufficient to ensure adequate enforcement, thus this action also proposes investigating sources of additional funding for the FMP. Possible sources include a local boater registration add-on fee (already in place in Pinellas and Hillsborough counties) or a reallocation of revenues from the state Salt Water Fishing License. (See FW-1 for a more extensive discussion of these options.)

Enforcement also could be enhanced through public education, as well as citizen monitoring and reporting of speed violations.

Recognizing that manatees travel great distances and will not always remain within the protected zones, this action also encourages boaters to install special cage-like guards on their propellers to avoid causing propeller injuries to manatees throughout Tampa Bay. These guards, which now are manufactured commercially and cost about \$100 each, also can protect the bay's seagrasses from propeller damage and reduce human injuries from boat propellers. Newer prop guard models have made substantial progress in resolving concerns about boat performance, and the FDEP's Bureau of Protected Species Management has budgeted money in FY 97-98 to test the various models on the market.

STRATEGY:

- STEP 1** Establish a workgroup to explore recommendations for establishing manatee protection zones in Tampa Bay. The workgroup's members should include environmental officials, manatee researchers and representatives from environmental and boating clubs, as well as boat manufacturers. The workgroup should submit recommendations to the NEP Policy Committee by September 1997.
Responsible parties: Tampa Bay NEP, ABM, FDEP
- STEP 2** Implement recommendations from Step 1, including adoption of zones through local ordinances and installation of signs denoting protection areas.
Responsible parties: FDEP, local governments,
- STEP 3** Increase funding for the FMP in Tampa Bay (see Action FW-1) and local law enforcement marine units to ensure adequate enforcement of boating speed and entry restrictions within the manatee protection zones. Among the possible revenue sources are a local boater registration add-on fee, or reallocation of state Saltwater Fishing License fees.
Responsible parties: Local governments, Florida Legislature (for Salt Water Fishing License revenues)
- STEP 4** Organize and train qualified volunteers to monitor and report speed or entry violations within the protection zones. Volunteers also could assist with monitoring new zones to gauge the effectiveness of the restrictions.
Responsible parties: FDEP, working with local environmental action groups such as Tampa BayWatch and the FMP's Coast Watch program.
- STEP 5** Continue ongoing manatee population and mortality studies in Tampa Bay. Reassess justification for the protection zones periodically based on monitoring data to determine the need for changes.
Responsible parties: FDEP/FMRI
- STEP 6** Promote the use of propeller guards to avoid injuring manatees throughout Tampa Bay.
Responsible parties: Tampa BayWatch, Florida Conservation Association, local boating and environmental groups and fishing clubs

SCHEDULE:

Steps 1-4 can be initiated in 1997, with appropriate rulemaking and financing in place in 1998. Step 6 also can be initiated in 1997, with demonstrations of the propeller guards to various boating and fishing groups. Step 5 is an ongoing project that should continue indefinitely.

FW-2

ACTION PLAN

Bay Fish & Wildlife

COST:

Designation of manatee protection zones would involve administrative and noticing requirements, as well as posting of designated areas. However, gaining public and boater support for designation of the zones and associated boating restrictions is expected to be a staff-intensive effort. Step 3 could be accomplished through a local boater registration add-on fee, or through a greater allocation of revenues from the state Salt Water Fishing License. Enforcement revenues also could be generated through legislative authorization of a law requiring local governments to transfer 25 percent of funds received in fines and penalties to the FDEP's FMP for those violations where arrests were made by FMP officers. The funds received from those transfers should be used exclusively for increasing enforcement capabilities of the FMP in the district generating the funds.

EXPECTED BENEFITS:

Designation of manatee protection zones will increase protection of manatees and vital seagrass habitats within Tampa Bay.

MONITORING ENVIRONMENTAL RESPONSE:

FDEP/FMRI currently monitors manatee abundance, distribution and mortality in Tampa Bay. These reports can be incorporated within the Tampa Bay NEP's Biennial Environmental Monitoring Report.

REGULATORY NEEDS:

Passage of local ordinances designating manatee zones. Legislative action also may be needed to ensure adequate funding for FMP and local enforcement of the restrictions.

RELATED ACTIONS:

FW-1, BH-3

Support Bay Scallop Restoration

ACTION:

Support bay scallop restoration by assisting stocking, spawning and monitoring efforts.

FW-3

BACKGROUND:

Improving water quality in Tampa Bay has created opportunities in the southern portion of the bay for recovery of the bay scallop, which all but disappeared from the bay in the 1960s. Experts suspect that water pollution was a key factor in the collapse of this highly sensitive species.

Studies by the Tampa Bay National Estuary Program (NEP) indicate that bay water quality has improved to levels necessary to support the reintroduction of this mollusk. However, stock sizes are so depleted that seeding is needed to jump-start a sustainable population.

To assist recovery, the Tampa Bay NEP has supported pilot projects by the University of South Florida (USF) to seed the bay with almost a quarter-million juvenile scallops raised in laboratories. Large seed stocks are necessary since natural predation and mortality of young scallops is high.

The Tampa Bay NEP also sponsored a study through the Florida Marine Research Institute (FMRI) to evaluate the effectiveness of existing stocking strategies. That study, completed in January 1996, indicates that current efforts can be successful, but must be continued for several years to compensate for variations in habitat quality and weather that may dramatically affect year-to-year scallop reproduction and survival. For example, an extensive red tide that plagued the Southwest Florida coast in 1995 adversely affected the survival of bay scallops that year.

Funding from the Program also supported the second phase of this project, which has allowed USF to seed an additional 100,000 juvenile scallops with the help of citizen volunteers. More than 50 waterfront residents in the southern portion of the bay have each adopted as many as 500 juvenile scallops, placed in "scallop condominiums" along docks until they spawn. A single adult may release as many as 500,000 eggs, but fewer than 5 percent are expected to survive to adulthood. Most adult bay scallops die shortly after spawning.

Other groups also are assisting in efforts to bring about return of the bay scallop. In August 1995, Tampa BayWatch directed a scallop air lift, with assistance from WFLA-TV, the Florida Marine Patrol and the Florida Conservation Association, transporting nearly 2,000 adult scallops by helicopter to Tampa Bay from the Steinhatchee River. This effort was repeated in 1996. The caged mollusks were placed at protected sites in Ft. DeSoto Park Aquatic Preserve where they could safely spawn. Another NEP-initiated project, the Great Bay Scallop Search, dispatches teams of snorkelers yearly to designated portions of the bay to look for live scallops produced

FW-3

as a result of the transplanting and seeding efforts. The most recent Scallop Search, conducted in September 1996 and sponsored by Tampa BayWatch, found 75 scallops in seagrass meadows within Boca Ciega Bay, Pinellas Point and Ft. DeSoto.

STRATEGY:

STEP 1 Identify funding sources to continue the scallop stocking program, which is directed by USF. The USF scallop laboratory is currently shut down due to lack of funding. Initial projects, which involved the seeding of almost 250,000 stock, and the placement of an additional 100,000 juvenile scallops at waterfront docks in the southern portion of the bay, have been completed.

Additional work would support placement of as many as two million lab-reared scallops annually in the bay over a period of about five years.

Responsible parties: Tampa Bay NEP, USF, FMRI

STEP 2 Monitor the bay to assess trends in scallop recovery. A study by FMRI researchers concluded that volunteer surveys such as the Great Bay Scallop Search are successful and should be continued, but an expanded monitoring program may be needed if scallop populations in the bay increase substantially.

Responsible party: Tampa BayWatch (for the Great Bay Scallop Search), FMRI

STEP 3 Fully evaluate the stocking program in Tampa Bay in 1999 to assess progress and initial efforts toward re-establishing a sustainable bay scallop population in the southern portion of the bay.

If a scallop population has not been re-established, and if monitoring and program evaluation fail to indicate a reasonable probability for success, determine whether the program should continue, or explore alternative techniques that may be more cost-effective. Provide recommendations to the Tampa Bay Management Board.

Responsible party: Tampa Bay NEP staff

SCHEDULE:

The first stocking project was accomplished in 1992-1993, followed by additional seeding of scallops in 1994-1995. Further stocking efforts are on hold pending funding availability. Monitoring of scallop populations and distribution began in 1994, and will continue yearly. A comprehensive evaluation of the success of the stocking program will be conducted in 1999.

COST:

Scallop costs for Phase 3, which is pending, are estimated at \$.05 each, which includes administrative support and overhead. Placing 2,000,000 scallops annually would cost about \$100,000. Costs for monitoring and program performance review are to be determined.

EXPECTED BENEFITS:

Recovery of this popular shellfish species, which depends on healthy seagrasses and favorable water quality conditions, may provide some of the most important evidence to date that Tampa Bay is on course to recovery.

MONITORING ENVIRONMENTAL RESPONSE:

The bay will be monitored to track population trends, and sightings and data from commercial fishermen will be incorporated. Evaluations will factor in appropriate recovery lag time for population recovery.

REGULATORY NEEDS:

None anticipated.

RELATED ACTIONS:

BH-1, BH-3, BH-4

FW-3

Assess the Need to Investigate the Cumulative Impacts of Power Plant Entrainment on Bay Fisheries

ACTION:

Determine whether a comprehensive study to assess the cumulative impacts of multiple power plant operations on Tampa Bay fish populations is needed. If a study is warranted and shows cumulative adverse impacts, adjust plant operations and maintenance schedules as appropriate to reduce power plant entrainment.

BACKGROUND:

Currently there are five steam electric plants utilizing open-cycle cooling systems on Tampa Bay: Tampa Electric Company's (TECO's) Big Bend, Gannon and Hooker's Point facilities and Florida Power Corporation's (FPC's) Higgins and Bartow plants (FPC's Higgins Plant is not currently operating). Open-cycle, or once-through, cooling is the most economical method of condensing steam from the turbines of steam electric plants. However, the volumes of ambient bay water used for this purpose, and the quantities of waste heat added to the bay as a result, can be significant.

Although the discharge of heated bay water from the power plants into the subtropical Tampa Bay estuary produces temperature changes that have demonstrable impacts, according to a Florida Department of Environmental Protection (FDEP) study, another impact results from the capture of planktonic eggs and larval fish and shellfish in the cooling-water intakes of the power plants. This process, called entrainment, can lead to high rates of mortality from physical, chemical and thermal stress. Estimates from power plant monitoring in the early 1980s project that 274 billion fish eggs and 83 billion fish larvae are entrained annually in Tampa Bay. However, in the absence of sufficient baseline information on current stock sizes, natural survival rates and losses caused by habitat degradation, fishing pressure and other factors, it is extremely difficult to assess the impact of power plant entrainment on overall bay fisheries populations.

Under the current regulatory system, each power plant must obtain operating permits from the Environmental Protection Agency (EPA) and the FDEP. But the permit review process only examines the localized impacts of each individual plant, and only two of the bay's five power plants have been required to conduct extensive studies of their fisheries impacts under Clean Water Act regulations. The cumulative impacts of multiple facilities on the fish populations of the bay have not been evaluated or considered.

Conducting a comprehensive study of cumulative impacts is an expensive and lengthy task, and could be fraught with legal complications. There currently is no requirement in the state rules governing power plants that cumulative impacts be addressed, and initiating such a study in Tampa Bay may necessitate a rule change. Additionally, the unique nature of each facility's operating processes, along with a lack of suitable

background information on fish populations and the effects of other human-related impacts such as fishing, may make a study on entrainment inconclusive.

Finally, the cost of a cumulative impacts study would be substantial, as would the installation of best available technologies to reduce the capture of eggs and larvae. Entrainment and impingement studies financed by power companies in the Hudson River exceeded \$2 million a year for monitoring and \$1 million for analysis. An eight-week entrainment sampling effort required for a TECO permit renewal cost \$250,000. And while some techniques to decrease entrainment are relatively low in cost (i.e., TECO's installation of fine-mesh screens on intake pipes at its Big Bend plant), other solutions such as the construction of cooling towers to reduce the need for bay water can cost hundreds of millions of dollars. These costs potentially could be reduced by the utilization of alternative sources of water, such as wastewater or industrial effluent, and further investigation of such alternative technologies should be encouraged.

Thus, the need to assess the cumulative effects of entrainment must first be demonstrated and the possible benefits of such a study balanced against its cost implications for utilities and their customers. EPA is currently involved in a national workgroup that is examining the biological effects of power plants, and this effort may lead to new regulations requiring power plants to minimize those impacts. This action encourages the participation of local and state regulators in the workgroup to assist them in reaching a consensus on whether a cumulative impacts study of power plants in Tampa Bay is warranted.

STRATEGY:

- STEP 1** Participate in the EPA national workgroup on power plant entrainment.
Responsible parties: Tampa Bay NEP, FDEP, Florida Marine Research Institute (FMRI), local power plant representatives
- STEP 2** Depending on the results of the EPA workgroup, determine whether a cumulative impacts study is necessary and justified. If it is, local, state and federal regulators should design a scope, identify potential data needs and funding sources, and conduct a comprehensive entrainment study. Based upon the results of that investigation, a plan to minimize entrainment through measures such as adjusting the operating or maintenance schedules of power plants for periods of peak plankton and juvenile abundance should be developed. The plan should be compatible with any new federal regulations adopted by EPA.
Responsible parties: EPA, FDEP, FMRI, local power plant representatives
- STEP 3** If warranted, amend state rules to require a cumulative impact review for all future power plant siting and operating permits located on Tampa Bay or its tributaries.
Responsible parties: Tampa Bay NEP, local power plants, FDEP

FW-4

ACTION PLAN

Bay Fish & Wildlife

SCHEDULE:

Step 1 was initiated in 1996 and workshops will continue through 1997, with regulatory action to be proposed in 1999 and implemented in 2001. Steps 2 and 3 are contingent upon Step 1. Step 2, if necessary, can be initiated in 1997. Step 3 can be initiated following the completion of the study, if the results of the study show a need for further action to reduce entrainment, beyond what new federal rules may require.

COST:

Step 1 entails only administrative costs. Step 2, the comprehensive cumulative impacts assessment, will likely involve extensive field, lab work and data analysis that could cost from \$1 million to \$5 million. The costs of remedial action to reduce entrainment have not yet been determined, but are expected to be substantial and should be evaluated in detail.

EXPECTED BENEFITS:

Enhanced fish stocks in Tampa Bay.

MONITORING ENVIRONMENTAL RESPONSE:

FDEP is the state agency responsible for power plant siting and permitting. EPA also has authority over power plant siting and operation permits. Monitoring of fish stocks is conducted by the FMRI. Results of any entrainment study, and subsequent actions to reduce the problem, will be reported in the Tampa Bay NEP's Biennial Environmental Monitoring Report.

REGULATORY NEEDS:

Possible amendments to the federal Water Pollution Control Act (Sections 316a, 316b and 402) and the Florida Electric Power Plant Siting Act (Sections 403.501 through 403.517, F.S.).

RELATED ACTIONS:

FW-5

Continue and Expand the Critical Fisheries Monitoring Program

ACTION:

Continue the state's Critical Fisheries Monitoring Program and expand it to include oligohaline tributaries of the bay.

BACKGROUND:

Tracking the long-term health of bay fisheries is an important component of the ongoing monitoring program being developed for the Tampa Bay management plan. Recent water quality improvements in the bay, along with new regulations on commercial and recreational fishermen, make regular assessment of fisheries trends even more critical for bay managers. The fisheries surveys will serve as a barometer for the success of management efforts, and provide an early-warning system to alert managers to potential problems that may require additional actions.

Currently, the state Department of Environmental Protection's (FDEP's) Critical Fisheries Monitoring Program (CFMP) provides the most comprehensive sampling of fisheries in the bay. This program, conducted by the FDEP's Florida Marine Research Institute (FMRI), employs stratified random and fixed-station monitoring to assess the abundance and distribution of fish and macroinvertebrates in Tampa Bay. The stratified random sampling divides the bay into six habitat types (i.e., seagrasses, deep-water, riverine), which are sampled at varying locations twice a year, usually in the spring and fall and using gear suited to that particular bottom type. The fixed-station monitoring samples 24 stationary sites scattered throughout the bay once a month, using a single type of fishing gear. Both survey methods record the number, species and length of fish and invertebrates captured, as well as the temperature and salinity of the water.

The program is financed by revenues from the state's Salt Water Fishing License. More than \$2 million was allocated statewide to Critical Fisheries Monitoring in fiscal year 1995-1996, with about \$500,000 of that dedicated to sampling in Tampa Bay.

While the monitoring attempts to be as thorough as possible, funding and manpower limitations mean that some areas of the bay potentially important to fish recruitment and survival are not surveyed. For example, of the bay's myriad tributaries, only the Little Manatee, Manatee and Alafia rivers are sampled. Oligohaline segments of the Hillsborough and Palm rivers and numerous tidal creeks in Upper Tampa Bay, such as Double Branch Creek and Rocky Creek, are not assessed. The existing program could be expanded to include more oligohaline areas, using cost-effective fixed-station monitoring. Additionally, a quick visual examination of fish and invertebrates for the presence of visible lesions could be added to assist bay managers in tracking the long-term movement of toxic contaminants through the bay system.

FW-5

ACTION PLAN

Bay Fish & Wildlife

STRATEGY:

- STEP 1** Evaluate the need and costs to expand CFMP into small tributaries and oligohaline areas, and identify candidate tributaries.
Responsible parties: Tampa Bay National Estuary Program (NEP) and FDEP/FMRI
- STEP 2** Require field scientists conducting the sampling to perform a quick visual examination for lesions on the fish and invertebrates they collect, and record the species, lesion type and location of the lesions, as well as the location where the affected fish were caught.
Responsible parties: FDEP/FMRI
- STEP 3** Incorporate results of the CFMP in Tampa Bay in the Biennial Environmental Monitoring Report, and redirect sampling efforts as needed.
Responsible parties: FDEP/FMRI, Tampa Bay NEP

SCHEDULE:

The Tampa Bay NEP and FDEP/FMRI will evaluate the feasibility of expanding fisheries sampling and develop a formal recommendation by April 1997. The detection of lesions indicative of toxic contamination could begin in 1997. The first expanded sampling also could begin in 1997.

COST:

The estimated annual cost for the current Tampa Bay sampling program is \$500,000. The cost of sampling 6-7 additional sites is estimated at \$50,000, based on salary estimates for two additional full-time staff personnel. Financing sources for additional sampling (if needed) could be pursued through a change in FMRI's current allocation from the Salt Water Fishing License revenues or identification of new revenue sources.

EXPECTED BENEFITS:

Implementation will provide more comprehensive information about the status and trends of bay fisheries, and will provide managers with an early-warning system to detect areas that may need additional management action.

MONITORING ENVIRONMENTAL RESPONSE:

FMRI currently monitors the health and abundance of fisheries within Tampa Bay. These reports can be incorporated in the Tampa Bay NEP's Biennial Environmental Monitoring Report for the bay.

REGULATORY NEEDS:

None anticipated.

RELATED ACTIONS:

TX-1, TX-3, BH-1, FW-1, FW-3, FW-4